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The prevention of infectious diseases in the optometric practice: A clinical survey

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Abstract

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THE PREVENTION OF INFECTIOUS DISEASES IN THE OPTOMETRIC PRACTICE: A CLINICAL SURVEY

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BIOGRAPHIES

Daphne Dee Nishikawa was born and raised in Honolulu, Hawaii. She attended the University of Hawaii at Manoa for her undergraduate curricula prior to admittance to the Pacific University College of Optometry where she received her Bachelors of Visual Science Degree. After receiving her Doctorate of Optometry degree in May 1994, she will return to Hawaii to practice.

Like Daphne, Linda T. Arakaki was also born and raised in Honolulu, Hawaii. She completed her undergraduate education at the University of Hawaii at Manoa where she received her Bachelors of Science Degree in biology. In 1990, she began her optometric education at the Pacific University College of Optometry where she will receive her Doctorate degree in May, 1994. After graduation, Linda plans to practice in Honolulu, Hawaii.

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ABSTRACT:

A survey regarding infectious disease control and awareness was sent to all practicing Hawaiian optometrists. The response rate was 51.45%. The survey addressed issues concerning current practices of infectious disease prevention in the optometric practice, attitudes and opinions towards specific diseases and therapeutic pharmaceutical agents (TPA) legislation. The state of Hawaii was chosen due to its large immigrant population, and its geographic location.

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THE PREVENTION OF INFECTIOUS DISEASES IN THE OPTOMETRIC PRACTICE: A CLINICAL SURVEY

INTRODUCTION:

Infectious diseases are a growing concern in all fields of health care including optometry. With an increase in the number of states with TPA privileges, optometrists are able to treat more conditions, and thus, are increasing their chances of exposure to infectious diseases. Optometrists are not only doing refractions, but are also diagnosing and treating diseases. The optometric educational curricula has changed so that optometrists will be able to diagnose and treat ocular disease. Because of this, optometrists are being recognized as primary care optometric physicians.

Although there are a multitude of pathogens that are potential causes of infectious diseases, this paper specifically recognizes the ones that have particular concerns with optometry. Background information describing each of the pathogens discussed in this paper are as follows:

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)

PATHOGEN: AIDS is caused by a retrovirus called the Human Immunodeficiency Virus that attacks the immune system cells including the T-helper cells which are an important factor in the defense against infection. Loss of function of these cells causes an individual to be vulnerable to opportunistic infections.[1]

MODE OF TRANSMISSION: HIV has been isolated in blood, semen, vaginal secretions, breast milk, saliva, tears, urine, cerebrospinal fluid and alveolar fluid. However, currently, the virus has been known to be transmitted only via blood and semen, although vaginal secretions and breast milk are also probable modes of transmission. The possibility exists, but is extremely remote, that tears are a vector of transmission. To date, there are no reported cases of HIV infection transmitted via tears.[2]

RISKS: The population at risk for AIDS has shifted from the stereotypical male homosexual or intravenous drug user to now include the entire population. Due to education concerning safer sexual methods, there has actually been a decline in the number of AIDS cases in the homosexual population. However, there has been a steady increase in the number of cases involving intravenous drug users despite an educational emphasis on the use of sterile needles. This may be due in part to the sexual practices of these people.[3] Due to these trends, chance of exposure to an HIV infected person increases. Certain occupations pose a greater risk to HIV infection, particularly the health care industry. Therefore, following the Center for Disease Control of Recommended Guidelines, as well as employing good judgment, becomes essential.

PREVENTION: Avoiding exposure to HIV infected blood, blood products and sexual secretions remains the primary mode of prevention. The Center for

Disease Control has issued Universal Precautions for the prevention of HIV transmission. These include: 1) hand washing with germicidal soap and water followed by drying with a disposable towel between patients; 2) protective barriers such as gloves, masks, gowns, aprons, and protective eye wear; and 3) taking care to prevent injuries when using needles, scalpels and other sharp instruments by placing them in puncture resistant containers after usage. In addition to the Universal Guidelines, additional guidelines, specifically dealing with ocular procedures, include: 1) disinfection of the Goldmann biprism in 3% hydrogen peroxide solution for 5-10 minutes followed by rinsing with saline prior to usage; 2) disinfection of all trial contact lenses with hydrogen peroxide or heat; 3) disinfection of all equipment that comes in contact with each patient by using 70% isopropyl alcohol, benzalkonium chloride, 0.5% hypochlorite bleach solution, or 3% hydrogen peroxide solution; 4) usage of single unit sterile fluorescein strips; and 5) discarding bottles of drugs or solution dispenser tips if contamination occurs.[4]

SIGNS AND SYMPTOMS: Signs and symptoms of AIDS are usually due to opportunistic infections secondary to a compromised immune system. Systemic infections may include Pneumocystis Carinii, Toxoplasma Gondii, Cryptosporidium, Candida Albicans, Cryptococcus Neoformans, Mycobacterium Tuberculosis, Salmonella, Herpes Simplex, Herpes Zoster, Cytomegalovirus, and Lymphatic Tumors.[5] All of these, except Pneumocystis Carinii and Salmonella, can exhibit ocular manifestations. Cytomegalovirus retinitis can cause blindness in the immuno-compromised patient. Noninfectious retinopathies include cotton wool spots, retinal hemorrhages, microaneurysms.[6]

TREATMENT: Currently, no cure has been found for AIDS. AZT, Gancyclovir, and Foscarnet are currently used inthe management of AIDS patients. Emphasizing the fact that these agents are not cures but, however have been shown to slow the progression of the disease. These medications also have very potent side effects and, therefore, are not always well tolerated by the patient. Antibiotics are being used prophylactically to help prevent opportunistic infections.[7] In cases of accidental exposure to HIV infected body fluids, initiation of zidovudine treatment has been indicated within a few hours after the incident for the best possible prognosis.[8]

EPIDEMIC KERATOCONJUNCTIVITIS (EKC)

PATHOGEN: The most common causative agent of Epidemic Keratoconjunctivitis is the Type 8 Adenovirus. The incubation period for this adenovirus ranges from 5-12 days. The Type 8 adenovirus is then shed in ocular secretions 14 days after onset.

MODE OF TRANSMISSION: Epidemic Keratoconjunctivitis is highly contagious. Outbreaks have been reported in private offices, industrial dispensaries and hospital outpatient clinics. The known vectors of transmission are contaminated fingers, instruments, tonometers, and other instruments.

PREVENTION: Since some of the signs and symptoms are not evident readily, precautions should be followed regularly to prevent the spread of this infection. The doctor's hands should be washed before every eye examination. Ophthalmic instruments should be disinfected with alcohol prior to each

examination. If a patient is suspected of having Epidemic Keratoconjunctivitis, the doctor could consider using gloves while examining the patient.

SIGNS AND SYMPTOMS: A patient usually will present with a unilateral redness, irritation, pain and tearing during the onset of EKC. A few days after the onset, the other eye usually becomes involved to a lesser degree. The patient may manifest photophobia, edema of the eyelids, marked conjunctival hyperemia, chemosis, an acute follicular reaction, subconjunctival hemorrhages, tender preauricular lymph nodes, and pseudomembrane or true membrane of the conjunctiva. Within 2-5 days after the onset, diffuse epithelial keratitis and focal superficial epithelial keratitis may be present. One to two weeks after onset, focal, round subepithelial infiltrates may persist from anywhere between a few weeks to a few months. Children may present with additional symptoms, such as fever, upper respiratory tract infection and gastroenteritis.

TREATMENT: Currently no specific treatment exists. The only proven helpful treatment available is supportive and prevention of secondary bacterial infection. Supportive treatment includes cold compresses, local vasoconstrictors or astringent eye drops, and, sometimes, topical corticosteroids (.12-.25% prednisolone eyedrops given 3-4 times a day) if subepithelial opacities are present.[9]

PHARYNGOCONJUNCTIVAL FEVER (PCF)

PATHOGEN: The agent that causes PCF is adenovirus 3 and 7. This most commonly occurs in children under 10 years of age and is associated with epidemic outbreaks.

MODE OF TRANSMISSION: The virus is most commonly transmitted via droplets spewed into the air after coughing or sneezing by an infected patient. Hand to eye transmission may occur, but is not as common.

PREVENTION: Preventing the spread of the virus requires isolation of the patient for up to two weeks. Strict hand washing as well as using separate washcloths and towels are strongly recommended for those coming in contact with an infected patient.

SIGNS AND SYMPTOMS: A patient with PCF will complain of a general feeling of malaise, fever and a mild pharyngitis. Often, the preauricular lymph node will be palpable. Ocularly, the patient will present with an acute follicular conjunctivitis along with chemosis, hyperemia, and a fine corneal superficial punctate keratitis. Patients also usually complain of foreign body sensation, photophobia, and epiphora.

TREATMENT: The disease is usually self limiting, and the best way to treat this disease is supportive. Prevention of the Spread of the disease is an important public health service.[10]

HERPES SIMPLEX KERATITIS (HSK)

PATHOGEN: The causative agent of Herpes Simplex Keratitis is the double stranded, icosahedral Herpes Simplex Virus (HSV). This virus infects 1/3 of the world's population. Type I HSV, "above the waist", is the most common form of HSV. Type II HSV, "below the waist" also exists, but is not as likely to cause keratitis. The virus remains dormant between episodes. During the dormant phase, the virus is in a non-infectious form that is undetectable by conventional laboratory assay. The cell reservoir for the latent virus is the sensory neuron in the dorsal root ganglion. The site of the primary infection indicates which sensory ganglion will harbor the virus during latency. A variety of bodily stresses can reactivate the virus at the ganglionic site and lead either to an active lesion or to asymptomatic shedding of the virus.

MODE OF TRANSMISSION: There are several routes of HSV transmission. Indirect transmission may be via hands or recently contaminated moist materials, such as towels.

PREVENTION: Doctors should practice regular handwashing and disinfecting of ocular instruments prior to every examination. If a patient presents with active lesions, dendritic corneal ulcers, or any of the other signs/symptoms, wearing gloves is desirable. The office should not utilize cloth towels which may harbor the virus. The use of disposable towels in the office will help decrease the spread of HSV.

SIGNS AND SYMPTOMS: Primary ocular HSV is self-limiting and manifests clinically 2-12 days after inoculation. Patients may present with numerous signs and symptoms which include malaise, fever, myalgias, lymphadenopathy, vesicular skin lesions (periocular and elsewhere), unilateral regional adenopathy, pain, tearing, itching, swelling of the lids, watery discharge, and a follicular conjunctivitis. Within 10-14 days of the infection, the first corneal signs/symptoms may appear which include mild foreign body sensation, photophobia, mild blurring of vision, and epithelial punctate keratitis of the central cornea evident with fluorescein or rose bengal staining. Recurrent ocular HSV involves the Trigeminal, Ciliary, or Superficial Cervical Ganglion. Any stress (fever, sunlight, UV, trauma, emotions, menstruation, immunosuppression, etc.) can trigger viral activation. There is often corneal involvement in HSV and HSV reactivation. Immunocompromised patients, such as those with AIDS and cancer, often exhibit a more severe form of HSK that progresses rapidly with dendrites and corneal ulcers.

TREATMENT: The use of antiviral drugs are helpful in treating the patient. Idoxuridine is a pyrimidine analog and incorporates into both the viral and host DNA. The average response rate is 76%. The drug, however, has poor corneal penetration and many side effects. Vidarabine is a purine analog that inhibits DNA polymerase by incorporating into both viral and host DNA. The response rate is 90-95%, and exhibits a lower toxicity than the previously mentioned drug. Trifluorothymidine is a pyrimidine analog that has better ocular penetration and a response rate of 95%. Acyclovir ointment can be used on active skin lesions.[11]

PSEUDOMONAS AERUGINOSA

PATHOGEN: Pseudomonas Aeruginosa is a gram negative rod bacteria that is an obligate aerobe with minimal growth requirements. Pseudomonas aeruginosa tolerates a wide temperature range, and is resistant to chemical disinfection. This bacteria is an important cause of bacterial keratitis.

MODE OF TRANSMISSION: Pseudomonas Aeruginosa is transmitted by contaminated water and agents such as fluorescein solutions, irrigating solutions, contact lens solutions, and cosmetic preparations. When contaminated solutions come in contact with an eye that has epithelial disruption, the organisms may adhere and infect the disrupted tissue of the cornea.

PREVENTION: Since solutions are the mode of transmission, optometrists must make certain that solutions are stored properly, and that contaminated solutions are disposed of immediately. Contact lenses should also be properly disinfected.

SIGNS AND SYMPTOMS: The patient will present with an irregular shaped corneal ulcer and a history of some sort of injury to the eye. There will usually be a lot of pain and discharge. A hypopyon may also be present. If left untreated, the prognosis is corneal perforation and loss of the eye.

TREATMENT: Antibiotics in the aminoglycoside group such as gentamicin, tobramycin, amikacin, and polymyxin B are indicated in treating Pseudomonas Aeruginosa infections.[12]

INCLUSION CONJUNCTIVITIS

PATHOGEN: The agent responsible for inclusion conjunctivitis is Chlamydia Trachomatis. Throughout the world, it infects 3 to 4 million people a year and is the most common sexually transmitted disease in the developed world. Of these, 0.01% to 0.03% will develop inclusion conjunctivitis, which amounts to about 30,000 new cases each year. Over one half of individuals with chlamydial eye disease have concomitant genital infection.

MODE OF TRANSMISSION: Transmission of the organism is by direct contact of the eye with the genital or urinary secretions such as hand to eye contamination. Eye to eye transmission is rare, has been reported. Indirect transmission can also occur by swimming in poorly chlorinated pools.

PREVENTION: Proper education, hygiene and sanitation are the most effective ways to prevent the transmission of the disease. In the optometric office, the organism is inactivated with proper use of disinfectants such as formalin and phenol.

SIGNS AND SYMPTOMS: Infected patients manifest with a follicular response in both the upper and lower palpebral conjunctiva. There is asociated bulbar chemosis and hyperemia, mucopurulent discharge, and preauricular lymphadenopathy. In advanced cases, there is often scarring and cicatrization of the palpebral conjunctiva, and Herbert's Pits at the limbus of the cornea.

TREATMENT: Systemic antibiotics such as tetracycline or erythromycin are used to treat chlamydial infections.[13]

GENERAL BACTERIAL CONJUNCTIVITIS

PATHOGEN: Acute purulent conjunctivitis is usually due to Neisseria Gonorrhea. Acute catarrhal conjunctivitis etiology, includes Streptococcus, Haemophilus Influenza biotype III, Staphylococcus, Pneumococci, E. Coli, Proteus, and Moraxella Lacunata. Bacterial conjunctivitis is commonly known as "pink eye", and may occur sporadically or epidemically.

MODE OF TRANSMISSION: Transmission of Neisseria. Gonorrhea is usually by direct contact with genital discharge, however, cases of hand to eye transmission have been reported. As for the other bacterial pathogens mentioned above, transmission usually occurs through direct contamination by hand to eye contact.

PREVENTION: Proper patient education and hygiene is necessary to prevent the spread of these infection. In the optometric office, all instruments must be appropriately disinfected, with strict hand washing by the doctor, an obvious requirement.

SIGNS AND SYMPTOMS: Infected patients will present with an acute hyperemic conjunctiva associated with a purulent discharge, lids sticking together upon awakening, and possible corneal infiltrates. Often there are small subconjunctival hemorrhages present, and in advanced cases, there may be corneal ulcers. When the etiology is Neisseria Gonorrhea, all the symptoms are more severe and the time of onset is more rapid.

TREATMENT: When a bacterial conjunctivitis is suspected, cultures should be obtained to identify the specific pathogen, and topical antibiotics prescribed for the specific pathogen involved. In cases where Neisseria Gonorrhea is the cause, systemic antibiotics plus topical antibiotics are necessary, and hospitalization may also be required.[14]

TUBERCULOSIS

PATHOGEN: The agent that causes tuberculosis is Mycobacterium Tuberculosis, an acid fast obligate aerobe bacterium.

MODE OF TRANSMISSION: When an infected patient coughs, droplets are expelled and travel two to three feet before falling to the floor, landing on objects or contacting people. Some of the droplets evaporate, leaving only the tubercle organisms which can circulate in the air of a closed room for many hours. These organisms are inhaled and conducted to the alveoli of the lungs. Immunocompromised individuals are very susceptible to infection with Mycobacterium tuberculosis.

PREVENTION: Since the organism is an airborne pathogen, it is recommended that infected patients wear a mask to limit the sputum particles released in the air. Examination rooms should be well ventilated, and health care providers coming in close contact with suspected of infected patients should wear a protective mask.

SIGNS AND SYMPTOMS: The main ocular manifestation of tuberculosis is posterior uveitis. The patient will present with yellow-white choroidal nodules having distinct borders, chorioretinal scars, and vitritis. The most common ocular complaints are decreased vision and floating spots.

TREATMENT: The treatment of tuberculosis is with systemic antibiotics, such as isoniazid, rifampin, ethambutol or pyroxidine hydrochoride. Isolation and bedrest are also recommended to prevent the spread of infection as a public health measure.[15]

Infectious diseases are prevalent all over the United States. These diseases are of particular interest in the State of Hawaii due to a large immigrant population. It is estimated that approximately 8,000 immigrants enter Hawaii each year, mostly from Asia. In order to be granted visas, immigrants must undergo a complete health examination, however, some systemic conditions do not interfere with immigrants obtaining a visa. Tuberculosis, eye, respiratory, and skin infections are among the leading health problems of the immigrants. Testing for Hepatitis B, which has a higher prevalence in Asia and the Pacific Islands, is not required for visa application. Due to language and cultural barriers, immigrants may not understand the consequences that their infections may have on the people of Hawaii.[16]

All health care professionals, including optometrists, in Hawaii deal with the ramifications of infectious diseases. The purpose of this survey is to discover what measures are being utilized for infectious disease prevention in the optometric office, attitudes about specific diseases, and therapeutic pharmaceutical agents attitudes regarding legislation.

METHODS:

A survey was sent to every licensed optometrist in Hawaii. The mailing list was obtained from the Hawaii Optometric Association and the Hawaii State Board of Optometry. A copy of the exact survey is included. (Appendix A)

A total of 206 surveys were mailed to all Hawaiian optometrists and there were 106 responses. The response rate was 51.45% with the highest percentage of responses coming from the county of Honolulu. Individual percentages for each county surveyed are as follows:

Honolulu	83	78.30%
Hawaii	03	02.83%
Maui	05	04.72%
Kauai	01	00.94%
None	07	06.60%
Inactive	07	06.60%

The surveys were sent to the entire population of optometrists licensed to practice in Hawaii. The margin of error was calculated as 3.8%, which was quite low. The results of the survey can be applied to the general population of optometrists in Hawaii.

RESULTS:

PROFILE OF OPTOMETRISTS SURVEYED

Years In Practice

0-5 years	30	28.30%
5-10 years	22	20.75%
10-15 years	25	23.58%
15-20 years	08	07.55%
20-25 years	04	03.77%
25-30 years	06	05.66%
>30 years	11	10.38%

Practice Mode

Private Practice/Professional Setting	55	48.67%
Private Practice/Retail Setting	11	09.73%
Group Practice with 1+ Optometrists	22	19.47%
Group Practice with 1+ Ophthalmologists	02	01.77%
Chain or Corporate Practice	06	05.31%
HMO or Group Maintenance	09	07.96%
Military	08	07.08%

Area Of Specialty

Vision Therapy	05	03.60%
Contact Lenses	54	38.85%
Sports Vision	03	02.16%
Family Practice	69	59.64%
Pediatrics/Child Care	03	02.16%
Other Responses:	05	03.60%
General		
Ocular Path/Therapeutics		

APPLANATION TONOMETRY

Disinfection Methods of Tonometer Probe

Hydrogen Peroxide	37		30.33%
Alcohol	53		43.44%
Bleach Solution	10		08.20%
Nonapplicable - Usage of NCT	17		13.93%
Other Methods	05		04.10%
Mercury Bichloride		01	
Cetylcide		02	
Cavicide		01	
Contact Lens Cleaning Solution		01	

Applanation Tonometry Within the Exam Sequence

Performed Before a Contact Lens Fitting	35	33.33%
Performed After a Contact Lens Fitting	41	39.05%
Nonapplicable - Usage of NCT	29	27.61%

CONTACT LENS HANDLING

Precautions Taken To Prevent Contact Lens Solution Contamination

Disposal of Expired Solutions	91	36.99%
Capping Tips After Each Use	84	34.15%
Keeping Opened Solutions Away From Sink	21	08.54%
Replace Solutions on a Scheduled Basis	40	16.26%
Replace Only When Contamination Suspected	10	04.06%

Method of Trial Contact Lens Disinfection

Chemical	72	54.13%
Hydrogen Peroxide	34	25.56%
Heat	24	18.04%
Trial Lenses Not Used	03	02.25%

Frequency of Trial Lens Replacement

Upon Expiration Date	49	41.52%
After Opening of Container	08	06.78%
When the Lens is No Longer Usable	61	51.69%

Method of Contact Lens Removal

Fingers	100	82.64%
Gloved Fingers	00	00.00%
DMV Device	21	17.36%

EPIDEMIC KERATOCONJUNCTIVITIS EXPOSURE

Average Number of EKC Cases Per Year

0	26
1	10
2	17
3	13
4	03
5	14
6	04
7	03
8	00
9	02
10	08
12	01
14	01
20	03
40	01

Has the O.D. Ever Contracted EKC From a Patient?

Yes	02	01.98%
No	99	98.02%

FOREIGN BODY REMOVAL

Does the Doctor Remove Foreign Bodies?

Yes	41	39.80%
No	62	60.20%

Disinfection of Instruments Used for Foreign Body Removal

Disposable	22	32.85%
Autoclave	20	29.85%
Chemical	25	37.30%

Service for Disposing of Potentially Hazardous Biological Waste

Yes	18	28.57%
No	45	71.43%

GENERAL PREVENTION MEASURES

Who Does the Disinfection?

Doctor	83	68.59%
Technician	38	31.41%

Method of Disinfection

Swabbing Contact Areas With Alcohol	94	50.27%
Replacing Tissues on Contact Areas of Instruments	84	44.92%
Other Methods	09	04.81

Deodorize/Sanitize Room PRN
Swabbing Handles
Washing Hands
Wiping Counters

Routine Usage of Gloves

Yes	001	00.94%
No	105	99.06%

Indications for Usage of Gloves

On All Patients	02	01.42%
Foreign Body Removal	14	09.92%
Suspicion of Pathology	38	26.95%
If O.D. Has Open Wound	87	61.71%

When a Patient Has a Respiratory Infection

Reschedule the Appointment	31	26.96%
Have the Patient Wear a Mask	07	06.09%
O.D. Wears a Mask	16	13.91%
Proceed With the Exam	61	53.04%

When the Doctor Has an Infection, i.e. Cold or Flu

Refrain From Working	48	45.71%
Continue to Work	57	54.29%

HIV/AIDS EXPOSURE

Average Number of HIV/AIDS Cases Per Year

0	55
1	18
2	11
3	05
4	03
5	04
6	01
7	02
10	02
15	01
50	01

Disinfection Methods After Examining a HIV/AIDS patient

Alcohol	47	39.17%
Bleach Solution	20	16.67%
Hydrogen Peroxide	53	44.16%

Are Gloves Worn When Examining a HIV/AIDS patient?

Yes	45	43.69%
No	58	56.31%

Does O.D. Code Records for HIV/AIDS patients?

Yes	22	21.36%
No	81	78.64%

Support for Mandatory Doctor/Patient Disclosure for HIV/AIDS?

Yes	84	81.55%
No	19	18.45%

If Ocular Infection Due to STD, Then Would O.D. Question Sexual History?

Strongly Disagree	06	05.66%
Somewhat Disagree	07	06.60%
Neutral	26	24.53%
Somewhat Agree	30	28.30%
Strongly Agree	37	34.91%

It is Important for the O.D. to Know a Patient's HIV Status

Strongly Disagree	02	01.89%
Somewhat Disagree	03	02.83%
Neutral	09	08.49%
Somewhat Agree	32	30.12%
Strongly Agree	60	55.60%

It is Important for the Patient to Know an O.D.'s HIV Status

Strongly Disagree	06	05.66%
Somewhat Disagree	03	02.83%
Neutral	14	13.21%
Somewhat Agree	28	26.41%
Strongly Agree	55	51.89%

INFECTIOUS DISEASE EDUCATION

Is Information on Infectious Disease Prevention Provided to Patients?

Yes	29	27.36%
No	77	72.64%

Attitudes Toward Educating Technicians About Disease Control

Strongly Disagree	02	01.90%
Somewhat Disagree	00	00.00%
Neutral	02	01.90%
Somewhat Agree	18	17.14%
Strongly Agree	88	79.06%

TPA LEGISLATION

General Attitude

In Favor of	104	99.05%
Not In Favor of	001	00.95%

Treatment Options if TPA is Passed

Referral to Ophthalmologist	09	08.33%
Treat Within the Limits of TPA law	99	91.64%

Forecasted Rating of Treating Infectious Eye Diseases if TPA is Passed

Strongly Disagree	04	03.81%
Somewhat Disagree	05	04.76%
Neutral	17	16.19%
Somewhat Agree	40	38.10%
Strongly Agree	39	37.14%

TUBERCULOSIS EXPOSURE

Average Number of Cases Per Year

0	66
1	12
2	11
3	05
4	01
5	07
10	01
20	01
50	01
75	01

Precautions Taken if Tuberculosis is Seen or Suspected

O.D. Puts a Mask On	18	19.35%
Patient Puts a Mask On	04	04.30%
Both Put a Mask On	10	10.75%
Nothing Different is Done	61	65.60%

DISCUSSION:

GENERAL DISINFECTION PROCEDURES AND PRECAUTIONS

The general public is bombarded with information via the media concerning the AIDS epidemic. AIDS awareness has also sensitized the public to how diseases are transmitted in general. Practitioners must realize that they are, therefore, under scrutiny of their patients. Although specific mention is made of AIDS in this section, an application of other transmissible diseases such as hepatitis, herpes, chlamydia, epidemic keratoconjunctivitis, and tuberculosis are inferred. By practicing proper office hygiene, a doctor can be assured that he is not perpetuating the spread of a pathogen. In our survey, we asked each doctor who performs office disinfection tasks. The responses are as follows:

Doctor	68.59%
Technician	31.41%

"Dr. Roger Wilson of the New England College of Optometry comments that the very presence of HIV in tears 'indicates the remote possibility that HIV can theoretically be transmitted when using instruments and lenses in contact with the eye.'"[17] This raised another question as to the method of disinfection practiced in optometric offices. The responses are as follows:

Swabbing Contact Areas With Alcohol	50.27%
Replacing Tissues on Contact Areas of Instruments	44.92%
Other Methods Listed Individually From The Questions Asked	
Deodorize/Sanitize Room As Needed	
Swabbing Handles	
Washing Hands	
Wiping Counters	

Many health care practitioners are currently required to abide by the standards set by their profession, as well as the guidelines set by the Center for Disease Control and the Occupational and Safety Health Administration. Optometry is currently not required to use gloves, masks, protective eye wear, gowns or aprons when examingpatient. Although the CDC says there is no data to support the use of gloves by O.D.s for procedures such as fitting contact lenses, it does urge doctors to wear disposable gloves when dealing with a red eye. Gloves should also be worn if the patient has sores in the orbital region or if the doctor has lesions of any kind on his hands.[18] We asked optometrists whether or not they routinely wear gloves when examining every patient. The results are as follows:

Yes	00.94%
No	99.06%

Since the overwhelming majority responded "no", we then inquired as to what situations would necessitate the use of gloves. The responses are as follows:

On All Patients	01.42%
Foreign Body Removal	09.92%
Suspicion of Pathology	26.95%
If The O.D. Has An Open Wound	61.71%

61.71% of optometrists understand the potential risk involved when they have an open wound. The skin is one of the body's natural barrier to infection. Whenever it is compromised, the risk of infection is greatly increased. The 26.95% of optometrists who said they would wear gloves when pathology is suspected is surprisingly low due to the increased risk of potential pathogens. Since the Therapeutic Pharmacological Agents law has not been passed yet in Hawaii, this may decrease the amount of pathology seen by optometrists. This may also be a factor in the low percentage of optometrists wearing gloves when removing a foreign body. However, gloves should always be worn when blood contamination is possible, such as with a compromised conjunctiva.

A survey was conducted by Joseph Hallack, O.E., Ph.D., O.D., who advocated the use of powder-free latex hospital disposable gloves while fitting contact lenses. A questionnaire was given to 30 patients to obtain their opinion of glove usage in the optometric office. The results from the survey are taken from the article "Office Hygiene".[19]

> Did you take notice that the doctor was wearing protective gloves during the eye examination: yes 93.6%
> Are you in favor of doctors wearing protective gloves during an eye examination: yes 90%
> Do you think that every doctor should wear protective gloves especially when fitting contact lenses: yes 94%
> Would you rather patronize the doctor wearing protective gloves over the one that does not: yes 66.6%
> In your opinion, is the wearing of protective gloves for your own protection or the doctor's: both 96.7%

In general, health professionals come in close contact with their patients. Optometrists need to come almost face to face with a patient while doing ophthalmoscopy. Commonly, the patient presents to the office for a routine eye exam with a cold or flu. We asked optometrists what they do when a patient presents with a respiratory infection? The responses are as follows:

Reschedule the Appointment	26.96%
Have the Patient Wear a Mask	06.09%
O.D. Wears a Mask	13.91%
Proceed With the Exam	53.04%

According to current recommendations, it is best for the patient to wear the mask if he or she must be examined that day. This keeps the infection contained as much as possible and decreases airborne pathogens. The majority of optometrists in Hawaii, 53.04%, proceed with the examination without taking any precautionary measures. In 1990, the incidence rate of tuberculosis in Hawaii was 17.6 per 100,000 as compared to 9.5 per 100,000 for the general U.S.

population.[20] This is an interesting result verifying that Hawaii has one of the highest incidences of tuberculosis in the United States. To decrease the risk of becoming ill, the doctor may choose to reschedule an ill patient's appointment. Thus, the doctor may decrease the likelihood of losing valuable chair time due to their own illness.

When a doctor has a respiratory infection, optometrists responded that they would:

Refrain From Working	45.71%
Continue to Work	54.29%

The majority continue to work possibly due to the inconvenience of finding a substitute doctor or losing patients. The doctor should base his decision on the degree to which his respiratory infection is contagious. This brings an ethical consideration into the picture. The doctor should do what is in the best interest of the patient at all times.

GOLDMANN APPLANATION TONOMETRY (GAT) DISINFECTION

Goldmann Applanation Tonometry is a method widely used by optometry to check the intraocular pressure. The probe of the instrument, called the biprism, is the portion that comes into contact with the tear layer and cornea of the patient. Since the AIDS virus has been isolated in tears, appropriate disinfection methods must be utilized for all instruments contacting tears. Specific recommendations by the Center for Disease Control (CDC) as effective against HIV are: 1) 5-10 minute soak in 1:10 dilution of bleach; 2) 5-10 minute soak in 3% hydrogen peroxide; and 3) 5-10 minute soak in 70% ethanol or isopropanol.

Many optometrists disinfect the biprism with an alcohol swab between uses due to convenience. However, this is not a recommended method of disinfection according to the CDC. The instruction manual for Goldmann tonometers also specifically warns against the use of alcohol solutions. Of the 106 optometrists that responded to our survey:

8.20% use bleach
30.33% use hydrogen peroxide
43.44% use alcohol
4.10% use a non-approved method such as mercury bichloride, contact lens cleaning solution, cetylcide, and cavicide.

An article by Nada J. Lingel, O.D., M.S. and Bradley Coffey, O.D. titled "Effects of disinfecting solutions recommended by the Center for Disease Control on Goldmann tonometer prisms," revealed that the method of first choice for the Goldmann biprism is soaking in a three percent hydrogen peroxide solution for 5-10 minutes. The biprism should be rinsed completely with saline before subsequent use to prevent corneal damage. Though the other two methods recommended by the CDC are effective in disinfecting the biprism, the study by Lingel and Coffey shows that such methods may cause damage to the biprism and secondarily adversely affecting the cornea.[21]

If a contact lens fitting is performed, then the sequencing of Goldmann Applanation Tonometry within the examination may adversely affect the cornea. The results of our survey reveal that:

33.33% performed GAT before a contact lens fitting
39.05% performed GAT after a contact lens fitting

Our proposal is that performing GAT before a contact lens fitting may result in corneal epithelial damage which predisposes a patient to infection. To date, there has been no study done to prove this proposal.

CONTACT LENS HANDLING

Contact trial lenses and solutions can be a source of infections if not properly handled. Disinfection methods include heat, peroxide, and chemical. The chosen in-office method for trial contact lens disinfection in this survey were as follows:

Chemical	54.14%
Hydrogen peroxide	25.56%
Heat	18.05%

Contact Lens Practice by Robert B. Mandell O.D., Ph.D., references research by Donzis et al which studied the methods of contact lens disinfection and related it to the subsequent contamination of contact lens cases. Combining all the methods used, one third of patients's contact lenses showed evidence of contamination. Generally, this is due to poor disinfection instruction to the patients and poor patient compliance. Therefore it is imperative that contact trial lens disinfection be done in accordance with FDA approved guidelines by both the patient and office personnel responsible for the cleaning of trial lenses.[22]

The Center for Disease Control established guidelines for the disinfection of trial contact lenses between fittings are as follows: 1) disinfection of trial hard lenses with a commercially available hydrogen peroxide contact lens disinfecting system currently approved for soft contact lenses (other hydrogen peroxide may contain preservatives that could discolor lenses). Alternatively, most trial hard lenses can be treated with the standard heat disinfection regimen used for soft lenses; 2) Rigid gas permeable (RGP) trial fitting lenses can be disinfected by using the above hydrogen peroxide disinfection system. RGP lenses may warp if they are heat disinfected; 3) Soft trial fitting lenses can be disinfected using the same hydrogen peroxide system. Some soft lenses have also been approved for heat disinfection.[23]

Another concern in trial contact lens contamination concerns the frequency of replacement. Our survey shows that trial contact lenses are replaced:

Upon expiration	41.53%
After opening of container	06.78%
When lens is no longer usable	51.69%

This survey demonstrates that practitioners are oftenexceeding manufacturers' recommended shelf-life of a lens. Our opinion is that this may increase the likelihood of contamination, thus leading to increased infections. The proper storage and replacement of contact lens solutions is necessary to prevent contamination. Our survey shows the variety of precautions being taken. These include:

Capping tips after each use	34.15%
Keeping solutions away from the sink	08.54%
Disposal of expired solutions	36.99%
Replacing solutions on a scheduled basis	16.26%
Replacing only when contamination is suspected	04.07%

We agree on the importance of capping tips after each use, and keeping solutions away from the sink to prevent contamination. Capping tips ensures that any exposure to external contaminants (i.e. fingers, lenses, airborne particles, etc.) will be prevented. The sink can be a source of a variety of microorganisms, therefore, it is only logical to store solutions away from this area. Contact lens solution manufacturers print an expiration date on each bottle to show how long the sterility is guaranteed. After this date, the manufacturer is no longer responsible if contamination occurs. If a doctor suspects contamination before the time of expiration, and thus disposes of the bottle then he is taking the safest precautionary measure.

The health professions in general have become aware of the increasing importance of using gloves while examining patients. Currently, it is not mandatory for an optometrist to wear gloves during an examination, however, dentists are required to wear gloves while examining all patients. There are cases in which the CDC recommends that optometrists should wear gloves such as when caring for a patient who has a red eye, and when there are open sores on the patient's orbital region, or when there is a breakdown of the skin on the examiner's hands. However, there is no current data to support the routine use of gloves for procedures such as contact lens fitting.[24] The results of our survey indicate that the methods of contact lens removal practiced by optometrists are:

Fingers	82.64%
Gloved fingers	00.00%
Device such as DMV	17.36%

These results are consistent with the existing standard which does not require the usage of gloves for contact lens fitting. In the future, doctora may want to consider wearing gloves while fitting contact lenses if they have an open wound on their hand. As a reminder, devices used to remove contacts (such as the DMV) should be disinfected between use on patients.

FOREIGN BODY REMOVAL

In the state of Hawaii, foreign body removal by optometrists is not a legally approved procedure. However, the results of our survey indicate that there is a large proportion of optometrists who remove foreign bodies. The responses to whether or not foreign body removal is performed in the office are:

Yes	39.80%
No	60.20%

Foreign body removal involves a compromised cornea, and thus allows microorganisms an opportunity to infect the cornea. Plus, the removed object and instruments used can also become potential sources of infection since they come in direct contact with the ocular tissues and tears. Therefore, precautions must be taken to prevent the chances of infecting a patient with potential contaminants. This survey posed questions about disinfection of the instruments used, and if special services for hazardous biological waste disposal were used. The results of the disinfection methods are:

Disposable instruments	32.85%
Autoclave	29.85%
Chemical	37.30%

This shows that a significant number of the practitioners use a chemical method. Instruments utilized for removing a foreign body need to be sterilized in accordance with existing guidelines. The three recommended methods are: 1) autoclaving and storage in a sterile packet; 2) washing with disinfected soap then drying it with a non-abrasive cloth, and then storing it in benzalkonium chloride and; 3) soaking the instruments in 70% alcohol. (1) These methods are also effective against the HIV virus. If needles, or other sharp instruments are utilized, they should be placed in a special "sharps" container to avoid needle stick injuries.[25] This then leads to the next question concerning whether or not practitioners utilize a special service to properly dispose of biological waste products. The results to this question are:

Yes	28.57%
No	71.43%

This indicates that a large majority of optometrists are not properly disposing of potential infectious waste, which may increase the chance of infecting another patient, staff or perhaps even the doctor. With the advent of the TPA law being passed, a larger proportion of optometrists will be removing foreign bodies. This suggests that prior to TPA approval, optometrists must be educated about the proper disposal of biological waste products.

INFECTIOUS DISEASE EDUCATION

Nosocomial infections are defined as infections that are acquired by patients in a health care institution. These type of infections are most common in hospitals. Many patients in hospitals are more susceptible to infections due to decreased immunity. In health care institutions, the staff is also more vulnerable to contracting infectious diseases.[26] Currently, many optometric offices are located in hospital settings, especially those within military and HMO settings, as well as multicare clinics. In these particular locations, there is an increased exposure to a wider array of pathogens. In these situations, education about infection prevention plays a large role in decreasing the spreading of diseases. Our survey posed a question whether or not information about infectious disease prevention is provided to patients. The results are:

Yes	27.36%
No	72.64%

This demonstrates that a majority of optometrists do not provide information to their patients about preventing infections. Many types of eye infections, such as EKC, are very contagious, and often more than one family member has this infection. Sexually transmitted diseases such as chlamydia, gonorrhea, and herpes simplex II are also of concern because they are often diagnosed by the optometrist due to ocular manifestations. In these cases, not only the patient, but all other sexual contacts must be treated. Therefore, patients should be educated about infectious disease before they occur. Since optometry is recognized as a primary care profession, infectious disease prevention will increasingly become an important aspect of optometric practice.

Another area regarding infectious disease education posed in the survey included attitudes about whether or not optometric technicians should be educated in infectious disease prevention. The results were:

Strongly Disagree	01.90%
Somewhat Disagree	00.00%
Neutral	01.90%
Somewhat Agree	17.14%
Strongly Agree	79.06%

Overall, the majority of responses were in agreement that technicians should be educated regarding infectious disease prevention. In some practices, optometric technicians are the personnel performing the disinfection between patients as well as providing contact lens care education. Therefore, technicians must have the knowledge of how pathogens are transmitted and the potential consequences of infections. By properly educating technicians, they can understand the necessity of proper cleaning and disinfecting. With such knowledge, technicians will demonstrate improved compliance and will, therefore, decrease the chances of nosocomial infections.

THERAPEUTIC PHARMACOLOGICAL AGENTS (TPAs)

Currently in the United States, 37 states have approved the use of therapeutic pharmaceuticals by optometrists. As of today, Hawaii remains one the of the states in which optometrists are not allowed any therapeutic privileges. However, the passing of the TPA law appears due on the horizon. This is evident with the increase of therapeutic pharmacology education requirements of Hawaii optometrists mandated by the Hawaii State Board of Optometry. Since infectious diseases and therapeutics are related, this survey posed questions concerning the attitudes of Hawaii optometrists about TPA legislation, treatment options if passed, and their opinions about the relationship between TPA legislation and the chances of seeing more infectious eye diseases. The results are:

General Attitude	
In Favor of TPAs	99.05%
Not In Favor of TPAs	00.95%
Treatment Options if TPA is Passed	
Referral to Ophthalmologist	08.33%
Treat Within the Limits of TPA law	91.64%

Forecasted Rating of Treating Infectious Eye Diseases if TPA is Passed

Strongly Disagree	03.81%
Somewhat Disagree	04.76%
Neutral	16.19%
Somewhat Agree	38.10%
Strongly Agree	37.14%

Theses results indicate that most optometrists (99.05%) favor the passage of the TPA law. 91.64% would opt to treat the pathology within their scope of practice rather than referring to an ophthalmologist. 7.41% favors TPA legislation but would still refer their pathology cases to an ophthalmologist. Despite this percentage, the decision to treat independently is still in the majority. When the TPA law is passed and implemented in Hawaii, it can be inferred that most of Hawaii optometrists will be treating the eye diseases within the limits of the TPA law.

75.24% of optometrists surveyed either somewhat agreed or strongly agreed that more infectious eye diseases will be seen, if passage of the TPA law occurs. This indicates that Hawaii optometrists are anticipating an increased exposure to possible infectious pathogens. With this in mind, practicing optometrists will have to consider changes in, or additional procedures that will further protect themselves, office staff, and other patients from exposure to infectious diseases.

EPIDEMIC KERATOCONJUNCTIVITIS EXPOSURE

Epidemic keratoconjunctivitis (EKC) is a viral eye infection that is highly contagious and often occurs in epidemic proportions, thus the name. The contagious period lasts up to two weeks. Adenoviruses 8 and 19, are the common pathogens of EKC that can be transmitted via finger to eye and via instruments that come into contact with the eye, such as applanation tonometer probes. Because of the highly contagious nature of EKC, it is important that all disinfection measures be followed when examining an acute red eye.[27]

Knowing the contagious nature of this disease, the questions posed to the optometrists concerned the number of EKC cases seen per year, and whether or not they have ever contracted EKC from a patient. The results are:

Number of EKC cases seen	Number of optometrists
0	26
1	10
2	17
3	13
4	03
5	14
6	04
7	03
8	00
9	02
10	08
12	01
14	01
20	03
40	01

Out of the 106 respondents to the survey, 24.53% saw 0 cases, 53.77% saw between 1 to 5 cases, 16.04% saw between 6 to 10 cases, and 5.66% saw more than 10 cases, with one doctor seeing 40 cases. Altogether, a total of 434 cases were seen in one year.

The question whether or not the optometrist has ever contracted EKC from a patient was asked to find out if "accidents" can happen in the office. An accidental rubbing of the eye after exposure can easily happen and thus transmit the disease. The results of the survey are:

Yes	01.98%
No	98.02%

Out of the 101 responses to this question, only two responded positively to the question. Though this is a very small minority, it still can happen and thus extra care must be taken when examining an EKC patient.

TUBERCULOSIS EXPOSURE

Tuberculosis was once thought a disease of the past. Since the mid 1980's, however, the epidemiology of tuberculosis has changed significantly with an increase in the number of cases. This increase has been accounted for by a number of factors including the AIDS epidemic. Tuberculosis becomes an opportunistic infection in persons with AIDS. A report from the Center of Disease Control indicated that between 1984 and 1985, there has been a 7% increase in the number of tuberculosis cases in Florida. It has been reported that 10% of the AIDS cases also had tuberculosis, thus establishing a link between tuberculosis and AIDS.[29] Other factors contributing to the rise in tuberculosis cases are the increase in the elderly population, an increase in drug abuse and, an increase in the homeless population. Some of these factors do play a role in the increase of tuberculosis rates in Hawaii, but to a lesser extent. The primary cause for the increase in incidence of tuberculosis in Hawaii is immigration. Many of the immigrants come from countries where there is resistance to standard tuberculosis treatment.[30]

From the most recent data published by the Hawaii State Department of Health, there were 196 new cases of tuberculosis reported in 1990 which was a 3.7% increase from the previous year. Of these, 84.2% of theses cases were diagnosed in foreign born immigrants to Hawaii. The largest group came from the Philippines (61.8%) , then Korea (15.2%) , followed by China (12.1%) and Vietnam (4.2)%).[31]

Since Hawaii has a significant immigrant population with about 8000 new immigrants arriving each year, mainly from Asia, the chances of examining a tuberculosis patient in the optometric office will obviously increase, given the recent data of an increase in the numbers of tuberculosis cases reported each year.[32] The survey posed the question to optometrists on how many patients with tuberculosis they have seen in a year. The results are:

Number of cases seen	Number of optometrists
0	66
1	12
2	11
3	05
4	01
5	07
10	01
20	01
50	01
75	01

Out of the 106 respondents to the survey, 66.26% saw 0 cases, 33.96% saw between 1 to 5 cases, and 3.77% saw 10 or more cases, with 75 cases being the most. Altogether, 223 cases were seen by optometrists. This number is higher than the 196 reported by the Department of Health. The data from the Department of Health only indicate the new tuberculosis cases, and not the ones diagnosed previously and under treatment. The survey did not indicate whether or not the patient had active tuberculosis; therefore inactive and treated cases may have also been reported in our survey.

The previous results show that optometrists in Hawaii are in a medical situation where exposure to tuberculosis is possible. The survey poses another question concerning the precautions taken to prevent the transmission of tuberculosis in the optometric office if tuberculosis is seen or suspected. The results are:

OD Puts a Mask On	19.35%
Patient Wears a Mask	04.30%
Both Wears a Mask	10.75%
Nothing Is Done	65.60%

The results indicate that a majority of optometrists are not doing anything different if tuberculosis is seen or suspected. In cases where the patient has been on treatment for at least two weeks, or when tuberculosis is in an inactive state, the pathogen is non-contagious and thus danger of transmission is unlikely and so neither doctor nor patient needs to wear a mask. If tuberculosis is suspected, or is not currently being treated, precautions should be taken. The survey indicates that 19.35% of optometrist would wear a mask, and 4.30 % would have the patient wear a mask. Guidelines have been established by the Center for Disease Control to prevent the transmission of tuberculosis. The tuberculosis pathogen is carried in airborne particles known as droplet nuclei that are small enough (1-5 microns) to persist in the air via normal air currents. These droplet nuclei are then inhaled by others. The goal of tuberculosis prevention is to reduce the exposure to droplet nuclei. The CDC recommends meeting ventilation standards for health care settings set by the American Society of Heating, Refrigerating, and Air Conditioning Engineers can help to reduce the probability of tuberculosis transmission. Other guidelines include containing droplet nuclei particles by having the patient wear a surgical mask or a valveless particulate respirator. If additional protection is required, the doctor can also wear a mask.[33]

AIDS/HIV EXPOSURE

AIDS is a life threatening condition that is on the rise with virtually every health profession witnessing an increase in the number of cases until a cure is found. According to the Center for Disease Control, approximately 750,000 people were infected with the HIV virus at the beginning of 1986. Current CDC studies show that there are approximately 2.5 million Americans infected with HIV. The CDC projects 40,000 new HIV infections to occur each year with an emphasis that these are conservative projections.[34]

The Department of Health for the State of Hawaii published its own statistical data which monitors the health status of its residents. The AIDS Surveillance Program reported 150 new AIDS cases in Hawaii during the 1990 calendar year. From 1981 to 1990, the total number of AIDS cases reported is 681. Of these, 471 are known to have died. Data from 1991 to present, has not yet been published. The table below shows the increasing trend of AIDS cases in Hawaii from 1981-1990.[35]

YEAR	TOTAL AIDS	MALES	FEMALES	KNOWN DEATHS
1981	01	00	01	01
1982	04	04	00	04
1983	05	05	00	05
1984	21	20	01	19
1985	44	44	00	41
1986	77	73	04	66
1987	103	100	03	87
1988	140	135	05	95
1989	136	132	04	74
1990	150	145	05	79
TOTAL	681	658	23	471

Of the optometrists surveyed, data was gathered concerning the average number of HIV/AIDS cases encountered per year. The results are:

Number of Cases	Number of Doctors
0	55
1	18
2	11
3	05
4	03
5	04
6	01
7	02
10	02
15	01
50	01

The total number of cases reported is 198. 51.89% saw 0 cases. 38.70% saw between 1 and 5 cases. 4.72% saw between 6 and 10 cases. 1.88% saw 15 or more cases. Despite over half of the doctors responding that they saw no cases of AIDS, this number may not reflect those individuals who did not disclose their HIV status. Therefore, the chances of an optometrist examining an HIV infected person may be higher than what this survey indicates.

During a routine eye examination, an optometrist may find ocular or systemic conditions which may raise suspicion of AIDS. Currently, a patient is not required to disclose this information to his or her optometrist. The importance of the optometrist knowing a patient's HIV status was ranked from strongly disagree to strongly agree. The ranking is as follows:

Strongly Disagree	1.89%
Somewhat Disagree	2.83%
Neutral	8.49%
Somewhat Agree	30.12%
Strongly Agree	55.60%

85.72% of optometrists feel that it is important to have knowledge of a patient's HIV status.

Next, our survey asked doctors their opinion concerning if AIDS disclosure by the patient should be mandatory. The results are as follows:

Yes	81.55%
No	18.45%

This indicates that doctors are in favor of future legislation mandating patient disclosure.

The public's concern regarding a patient's right to have access to their physician's HIV status has increased. Though this is a controversial topic, legislation for mandatory doctor disclosure may be considered. The CDC in 1991 urged health care workers to voluntarily get tested for HIV, but rejected any need for mandatory testing.[36] Kenneth M. Prager, M.D. suggests that soon doctors may display certificates showing their HIV-negative status.[37] Since Hawaii optometrists felt that it is important for them to know their patient's HIV status, we asked them to rank if it is important for a patient to have knowledge of the doctor's HIV status. The ranking is as follows.

Strongly Disagree	5.66%
Somewhat Disagree	2.83%
Neutral	13.21%
Somewhat Agree	26.41%
Strongly Agree	51.89%

78.30% agreed that the patient should be provided with the doctor's HIV status. This percentage also reflects the doctors who are willing to provide proof of their HIV status. Although this is a majority, there is a 7.42% difference between patient/doctor disclosure and doctor/patient disclosure.

Once a doctor has obtained knowledge of a patient's HIV status, documentation is difficult due to current patient privacy rights. Currently, in-office coding methods exist and are implemented to ensure that proper precautionary measures are taken. Each optometrist was asked whether a coding system is utilized for HIV patients. The responses are:

Yes	21.36%
No	78.64%

This indicates that most optometrists do not keep record of a patient's HIV status.

The Center for Disease Control recommends universal precautions for disinfecting instruments that come into contact with an AIDS patient. For surfaces and non-metallic equipment, a 1:10 (volume to volume) dilution of household bleach with water provides a hypochlorite concentration of about 0.5%.[38] After examining an HIV/AIDS patient, the disinfection method utilized by Hawaii optometrists are as follows:

Alcohol	39.17%
Bleach solution	16.67%
Hydrogen Peroxide	44.16%

Though alcohol and hydrogen peroxide are known to inactivate the HIV virus, the CDC's chosen method is a bleach solution. The results of the survey indicate that only 16.67% are using this recommended method.

In reference to a previously discussed section, 99.06% of optometrists do not routinely use gloves on every patient. 26.95% responded that they would use gloves if pathology is suspected. When examining an HIV/AIDS patient, the doctors surveyed responded as to whether gloves are used. The results are as follows:

Yes	43.69%
No	56.31%

Although these results give an impression of no resounding preference, in comparison to the 26.95% response of wearing gloves when pathology is suspected, there is an increase when HIV/AIDS is specifically involved.

Sexually transmitted diseases (STD) commonly exhibit ocular manifestations that may warrant further questioning of the patients sexual history. Optometrists may avert questioning the patient in this area because it may be an uncomfortable situation. This is mainly due to the patient not understanding the relationship that exists between the eyes and STDs. Optometrists were asked to rank the importance of pursuing sexual history when an ocular infection due to STD is present. Results are as follows:

Strongly Disagree	5.66%
Somewhat Disagree	6.60%
Neutral	24.53%
Somewhat Agree	28.30%
Strongly Agree	34.91%

Only 63.21% of optometrists would pursue questioning their patients if an STD is suspected. This indicates that many patients would not be educated about the potential ramifications to themselves and their sexual partner(s). This is important in cases such as chlamydia, where other sexual contacts must be identified so that proper treatment can be initiated.

CONCLUSION:

Hawaii will one day join the other 37 states who currently have TPA authorization. With the changes occurring in our society such as the increase in population, increase in poverty, decreasing access to health care, and the diseases that are occurring in epidemic proportions such as AIDS and TB, preventing the spread of infectious diseases should be a primary goal in optometry, as well as correcting visual disorders.

As more states gain privileges to broaden the scope of optometry, each practitioner's attitude towards disinfection must adhere to established guidelines. The guidelines set by the Center For Disease Control and the Occupational Safety And Health Administration are designed for the protection of healthcare workers as well as for the general population.

Hawaii's ideal location attracts many immigrants which makes it vulnerable to foreign diseases. Constant exposure to treatment resistant pathogens reemphasizes the need for proper precautionary measures to be undertaken. Hawaii's geographic location combined with it's immigrant population creates a laboratory-like environment that all health professions may learn from.

APPENDIX A: A COPY OF THE SURVEY

Place a mark next to the most appropriate answer(s).

1) **In which county do you practice in primarily?**

- ☐ Honolulu
- ☐ Hawaii
- ☐ Maui
- ☐ Kauai
- ☐ none of the above
- ☐ inactive-don't practice in Hawaii

2) **How long have you been out of school?**

- ☐ 0-5 years
- ☐ 5-10 years
- ☐ 10-15 years
- ☐ 15-20 years
- ☐ 20-25 years
- ☐ 25-30 years
- ☐ More than 30 years

3) **What best describes your type of practice?**

- ☐ Private practice/professional setting
- ☐ Private practice/retail setting
- ☐ Group practice with 1+ optometrists
- ☐ Group practice with 1+ ophthalmologists
- ☐ Chain or corporate practice
- ☐ HMO or group maintenance practice
- ☐ Military

4) **What best describes your area of specialty/expertise?**

- ☐ Vision Therapy
- ☐ Contact Lenses
- ☐ Sports Vision
- ☐ Family Practice
- ☐ Pediatrics/Childcare
- ☐ Other, please specify _____

5) **Who does the actual disinfecting between patients?**

- ☐ Doctor
- ☐ Technician

(6) **What is entailed in disinfection between patients? (check all that apply)**

- ☐ Swabbing contact areas with alcohol
- ☐ Replacing/disposing of tissues on contact areas of instruments
- ☐ Other, please specify _____

(7) **Are patients provided with information about infectious disease prevention?**

- ☐ Yes
- ☐ No

(8) **If you personally have an infectious disease, i.e. cold or flu, do you:**

- ☐ Refrain from working
- ☐ Continue to work

(9) **Do you routinely use latex gloves when examining patients?**

- ☐ Yes
- ☐ No

(10) **When would you feel it necessary to wear gloves when examining a patient?**

- ☐ On all patients
- ☐ When removing foreign bodies
- ☐ When pathology is suspected
- ☐ When I have an open wound

(11) **If a patient has a respiratory infection, then would you:**

- ☐ Request that the patient to reschedule the appointment
- ☐ Ask the patient to wear a mask
- ☐ Yourself wear a mask
- ☐ Proceed with the exam regardless

(12) **What is your method of disinfecting applanation tonometer probes?**

- ☐ Hydrogen peroxide
- ☐ Alcohol
- ☐ Bleach solution
- ☐ Other, please specify_____
- ☐ Non-applicable due to use of NCT

13) If applanation tonometry is done, then when is it done in the exam sequence?

- ☐ Before a contact lens fitting
- ☐ After a contact lens fitting
- ☐ Non-applicable due to use of NCT

14) What precautions are taken to prevent contact lens solutions from becoming contaminated?

- ☐ Disposal of expired solutions
- ☐ Capping tips after each use
- ☐ Keeping opened solutions away from the sink
- ☐ Replacing solutions on a scheduled basis
- ☐ Replacement only when contamination is suspected

15) How are trial contact lenses disinfected?

- ☐ Chemical
- ☐ Hydrogen peroxide
- ☐ Heat
- ☐ Non-applicable because trial lenses are not used

16) How long are trial lenses kept before replacement?

- ☐ Upon expiration date
- ☐ After opening of container
- ☐ When the lens is no longer usable

17) How do you prefer to remove contact lenses?

- ☐ Fingers
- ☐ Gloved fingers
- ☐ Device such as DMV

18) Do you support TPA legislation for Hawaii?

- ☐ Yes
- ☐ No

19) If TPA legislation is passed, then would you prefer:

- ☐ To refer to an ophthalmologist
- ☐ To treat within the limits of the TPA law

(20) Do you remove foreign bodies?

- ☐ Yes
- ☐ No

(21) If foreign body removal is performed, then how are the instruments disinfected?

- ☐ Disposable
- ☐ Autoclave
- ☐ Chemical disinfection

(22) If foreign body removal is done then do you have a special service that disposes of potentially hazardous biological waste?

- ☐ Yes
- ☐ No

(23) On the average, how many EKC cases have you seen in a year?

_____ Number of cases

(24) Have you ever contracted EKC from a patient?

- ☐ Yes
- ☐ No

(25) On the average, how many Tuberculosis cases have you seen in a year?

_____ Number of cases

(26) What precautions are taken if Tuberculosis is seen or suspected?

- ☐ I put a mask on
- ☐ I put a mask on the patient
- ☐ We both wear a mask
- ☐ Nothing different is done

(27) On the average, how many AIDS cases have you seen in a year?

_____ Number of cases

(28) Does your office have a specific code in identifying a patient as HIV positive?

- ☐ Yes
- ☐ No

29) **How would you disinfect your instruments after examining an AIDS patient?**

- ☐ Alcohol
- ☐ Bleach solution
- ☐ Hydrogen peroxide

30) **Would you wear gloves when routinely examining an AIDS patient?**

- ☐ Yes
- ☐ No

31) **Would you support legislation for mandatory doctor/patient disclosure for AIDS?**

- ☐ Yes
- ☐ No

PLEASE INDICATE HOW STRONGLY YOU DISAGREE OR AGREE WITH THE FOLLOWING STATEMENTS BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE FOLLOWING SCALE BELOW.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1	2	3	4	5

(32) **I believe technicians should be educated about disease control**
1 2 3 4 5

(33) **I believe that in the event that TPA legislation is passed, I will see more cases related to infectious eye diseases**
1 2 3 4 5

(34) **If I suspect an ocular infection due to an STD, I would pursue information about their sexual history**
1 2 3 4 5

(35) **I believe that it is important for me to know a patient's HIV status**
1 2 3 4 5

(36) **I believe that it is important for patients to know their doctor's HIV status**
1 2 3 4 5

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